INSTALLATION & CONFIGURATION MANUAL

SDM-1000, SDM-2000, SDM-4000
Single, Dual, Quad Input SD Digital Modulators

SDM-1000_2000_4000 Manual V1.0

TABLE OF CONTENTS

SAFETY PRECAUTIONS

The presence of this symbol is to alert the installer and user to the presence of uninsulated dangerous voltages within the product's enclosure that may be of sufficient magnitude to produce a risk of electric shock.

TO REDUCE THE RISK OF FIRE OR ELECTRIC SHOCK, DO NOT EXPOSE THIS DEVICE TO RAIN OR MOISTURE. DO NOT OPEN THE UNIT. REFER SERVICING TO QUALIFIED PERSONNEL ONLY.

❖ DO NOT apply power to the unit until all connections have been made, all components have been installed and all wiring has been properly terminated.

❖ DO NOT terminate, change or uninstall any wiring without first disconnecting the unit's power adapter from the device.

❖ This device is supplied with the appropriately rated 12VDC power supply with the center pin positive. The use of any other power supply could cause damage and invalidate the manufacturer's warranty.

❖ DO NOT connect the power supply to the device if the power cord is damaged.

❖ DO NOT cut the power cord.

❖ DO NOT plug the power supply into an AC outlet until all cables and connections to the device have been properly connected.

❖ The device should be installed in an environment consistent with its operating temperature specifications. Placement next to heating devices and ducts is to be avoided as doing so may cause damage. The device should not be placed in areas of high humidity.

❖ DO NOT cover any of the device's ventilation openings.

❖ DO NOT cover or obstruct the device's fan or fan openings.

❖ If the device has been in a cold environment allow it to warm to room temperature for at least 2 hours before connecting to an AC outlet.

PACKAGE CONTENTS

This package contains:

- ❖ One SDM-1000, SDM-2000 or SDM-4000 SD Digital Modulator
- ❖ One 12VDC 3A power supply
- ❖ One pair of mounting brackets
- ❖ Four adhesive pads
- ❖ One installation and configuration manual

Inspect the package before starting installation to ensure there is no damage and all supplied contents are present. Contact your distributor or dealer should the device be damaged or package contents are incomplete.

PRODUCT DESCRIPTION

KH's Digital modulators convert Digital Video Broadcasting (DVB) standard definition video and audio signals to DVB-T. The SDM-1000, SDM-2000 and SDM-4000 provide respectively single, dual and quad inputs. All units feature programmable channel and network names. Adjustable RF output (Normal, Inverted, and C.W.), adjustable logic channel numbering (LCN) and adjustable attenuation are standard features. The unit's front-mounted LCD display and controls allow for easy configuration and adjustments.

The SDM-1000, SDM-2000 and SDM-4000 are perfect for multi-video distribution solutions in the commercial and institutional market (hotels, motels, sports bars, restaurants, hospitals, casinos, business and university campuses, etc.) as well as home entertainment systems.

SPECIFICATIONS

	SDM-1000	SDM-2000	SDM-4000
INPUT			
Video Input	CVBS	CVBS	CVBS
Video Input Level	0.7-1.4 V (pp)	0.7-1.4 V (pp)	0.7-1.4 V (pp)
Video Mode	PAL / NTSC	PAL / NTSC	PAL / NTSC
Audio Input	Stereo	Stereo	Stereo
Audio Input Level	0.4 – 0.8V (p-to-p)	0.4 – 0.8V (p-to-p)	0.4 – 0.8V (p-to-p)
Input Connectors	Video (RCA) - Audio (RCA)	Video (RCA) - Audio (RCA)	Video (RCA) - Audio (RCA)
Input Impedance	75 ohm	75 ohm	75 ohm
OUTPUT			
Frequency Range	177.5 -816.5 MHz	177.5 -816.5 MHz	177.5 -816.5 MHz
Output Level	85 dBuV	85 dBuV	85 dBuV
Output Impedance	75 ohm	75 ohm	75 ohm
Channel Bandwidth	6,7,8 MHz	6,7,8 MHz	6,7,8 MHz
Channel Level Adjustment	20 dB typ.	20 dB typ.	20 dB typ.
MER	30 dB min.	30 dB min.	30 dB min.
Connector Type	"F" female	"F" female	"F" female
MODULATION			
Video Resolution	PAL 720x576 @25fps NTSC 720x480 @30fps	PAL 720x576 @25fps NTSC 720x480 @30fps	PAL 720x576 @25fps NTSC 720x480 @30fps
Video Compression	MPEG MP@ML	MPEG MP@ML	MPEG MP@ML
Audio Compression	MPEG1 Layer II	MPEG1 Layer II	MPEG1 Layer II
LCN	Yes	Yes	Yes
Carrier (OFDM Mode)	2K/8K	2K/8K	2K/8K
Guard Intervals	1/4, 1/8, 1/16, 1/32	1/4, 1/8, 1/16, 1/32	1/4, 1/8, 1/16, 1/32
Code Rate (FEC)	1/2, 2/3, 3/4, 5/6, 7/8	3/4, 5/6, 7/8	3/4, 5/6, 7/8
Constellations	16 QAM / 64 QAM	16 QAM / 64 QAM	64 QAM
GENERAL			
Power Supply	12 VDC 3-AMP	12 VDC 3-AMP	12 VDC 3-AMP
Consumption	1100 MA	1300 MA	1700 MA
Languages	English	English	English
Dimensions	300mm x 200mm x 47mm	300mm x 200mm x 47mm	300mm x 200mm x 47mm
Weight	1.66kg	1.72kg	1.86kg

*Specifications are subject to change without prior notice

SDM-1000_2000_4000 Manual V1.0

INSTALLATION

System Installer must adhere to Article 820-40 of the NEC that provides guidelines for proper grounding and specifies that the cable ground shall be connected to the grounding system of the building, as close to the point of cable entry as possible.

UNPACKING and INSPECTION

Each unit is shipped factory tested. Ensure all items are removed from the container prior to discarding any packing material.

Thoroughly inspect the unit for shipping damage with particular attention to connectors and controls. If there is any sign of damage to the unit or damaged or loose connectors contact your distributor immediately. Do not put the equipment into service if there is any indication of defect or damage.

PRODUCT PICTURES and DIAGRAMS

6
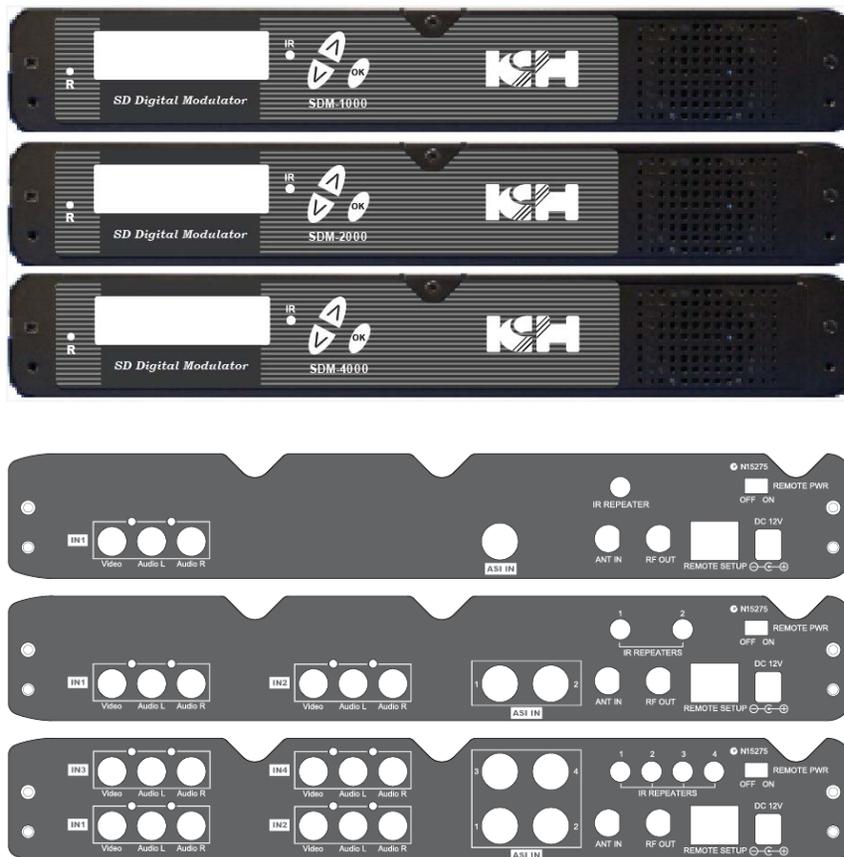
HARDWARE INSTALLATION and CONNECTIONS

1. The unit can be rack mounted in a standard EIA 19" rack. Attach the rack mounts if the unit is to be installed in a rack.

2. Use a 75Ω coaxial cable with RCA connectors to connect the **video source** (e.g., CATV, DVD, VCR, Camera) to the unit's **yellow RCA VIDEO INPUT jack** (IN1…IN4 depending on the DIGITAL model).
   Note: If the ASI input is required then use a cable with a BNC connector between the video source and the **ASI IN jack.**
   Repeat this step for each video source connection.
   It is highly recommended that quality coaxial cable and connectors be used for all video source connections.

3. Use RCA cables to connect the **audio source** to the red / white **AUDIO L and AUDIO R INPUT jacks (**IN1…IN4 depending on the DIGITAL model). Use the red and white jacks for audio input or either one for a single input.
   Repeat this step for each audio source connection.
   Be sure the video and audio connections for each source are consistent with the unit's inputs (IN1…IN4 depending on the DIGITAL model).
   It is highly recommended that quality cables and connectors be used for all audio source connections.

4. Use a quality 75Ω coaxial cable with "F" connectors from the unit's **RF OUT jack** to the **distribution system** (combiner or reverse splitter) or directly to a television.

5. Connect the included 12VDC 3A power supply to the unit's **DC 12V POWER** jack.

6. Connect the 12VDC 3A power supply to an appropriately rated AC power outlet.

Building Distribution Network

Launch Amplifier

Combiner

SDM-4000
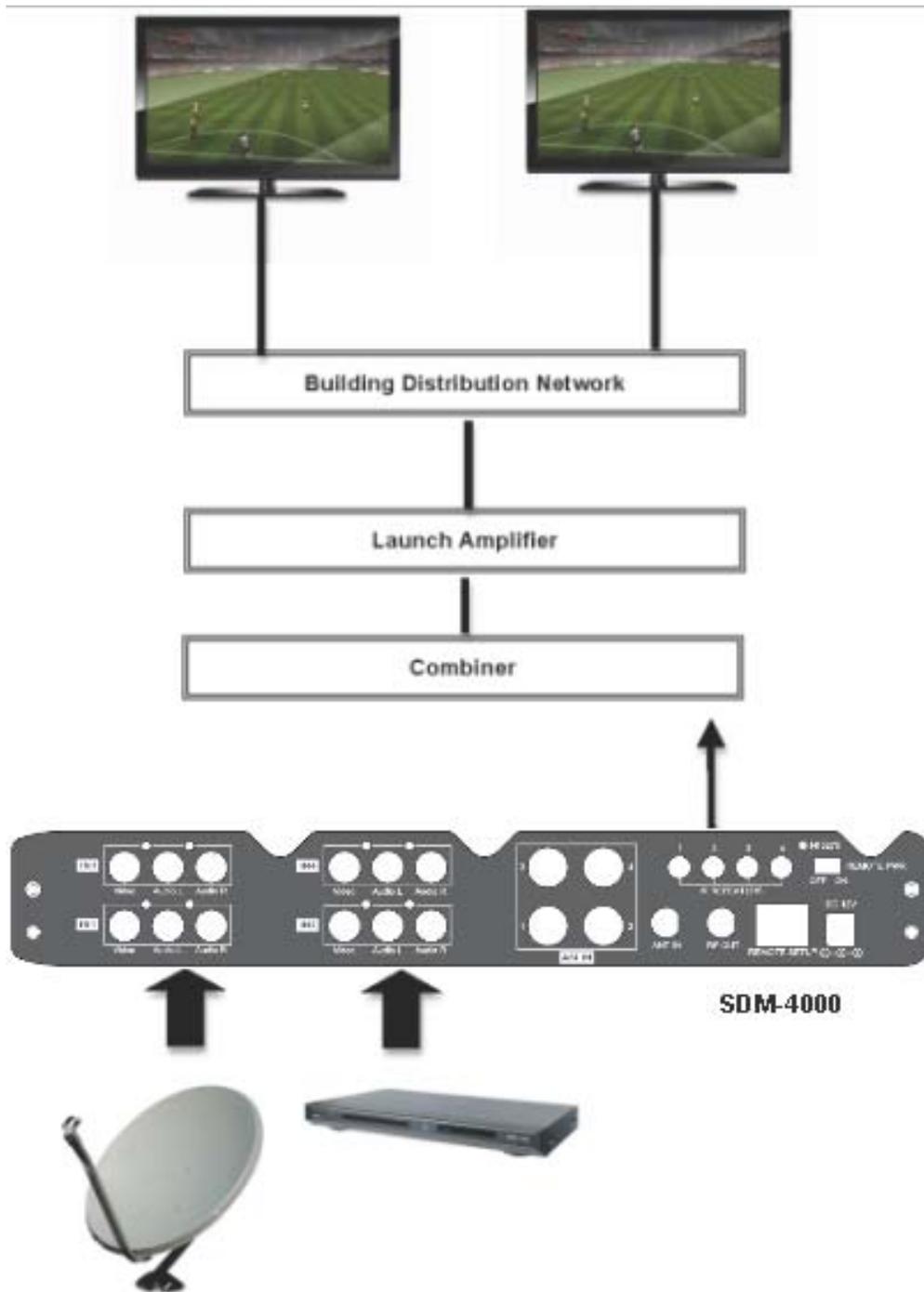
MODULATOR SETUP AND CONFIGURATION

INITIAL SETUP TO FACTORY DEFAULT

The digital modulator's front panel is used to configure the modulator as desired.

Before performing a configuration it is advised that the "Factory Default" settings should be initialized as follows:

- ❖ Power up the device and wait until the booting process is complete.
- ❖ Once complete, press the **Scroll Up/Down button** until "**Default Config**" appears in the menu. After "Default Config" appears press the **OK button**.
- ❖ Power down the unit by removing the power supply cable from the DC 12V power jack.
- ❖ Wait 5 seconds and re-connect the power supply.

MODULATOR CONFIGURATION

Once the modulator is powered back up it will go through an internal booting process. When "**Running**" appears in the LCD Display the unit is ready for programming or operation.

- ❖ **Password** – Press the OK button to select a 4-digit password. Use the **Scroll Up/Down button to search and select individual numbers for the password**. The default password is 0000. Press the OK button for each number to set the password.

- ❖ **Advanced Menu** – To access the Advanced Menu first enter the password by pressing the OK button. Once the correct password is entered press the OK button and the LCD Screen will display "Advanced Menu Output Channel". The following configuration options are available under Advanced Menu:

  - ▪ **Output Channel** – Use the Scroll Up/Down button to change the output channel. Channels 2 to 69 are available. Once the desired output channel is selected press the OK button to set the channel.

  - ▪ **Attenuation** – Use the Scroll Up/Down button to select Attenuation. Press the OK button to enter the Attenuation menu. Use the Scroll/Up down button to select the desired attenuation in 1dB increments from 0 to minus 20 dB. Once the desired attenuation level is found press the OK button to set.

  - ▪ **Constellation** – Use the Scroll Up/Down button to select Constellation. Press the OK button to enter the Constellation menu. The modulator allows for either QAM16 or QAM64 for SDM-1000 and SDM-2000, and only QAM64 for SDM-4000. Select the desired Constellation then press the OK button to set.

  - ▪ **FEC** – Use the Scroll Up/Down button to select FEC. Press the OK button to enter the FEC menu. Use the Scroll Up/Down button to select the desired FEC values then press the OK button to set. Menu options are 1/2, 2/3, 3/4, 5/6, 7/8 for SDM-1000 and 3/4, 5/6, 7/8 for SDM-2000 & SDM-4000. The factory default is 3/4.

- **GUARD INTERVAL** – Use the Scroll Up/Down button to select GUARD INTERVAL. Press the OK button to enter the GUARD INTERVAL menu. Menu options are 1/4, 1/8, 1/16, 1/32. The factory default is 1/16. Use the Scroll Up/Down button to select the desired GUARD INTERVAL and press the OK button to set.

- **OFDM MODE** –Use the Scroll Up/Down button to select OFDM MODE. Press the OK button to enter the OFDM MODE menu. Menu options are 2K, 8K. The factory default is 8K. Use the Scroll Up/Down button to select the desired OFDM MODE and press the OK button to set.

- **RF Output** – Use the Scroll Up/Down button to select RF Output. Press the OK button to enter the RF Output menu. Menu options are Normal, Inverted and C.W. The factory default is Normal. Use the Scroll Up/Down button to select the desired RF Output and press the OK button to set.

- **Brightness** – Use the Scroll Up/Down button to select Brightness. Press the OK button to enter the Brightness menu. Use the Scroll Up/Down button to select the desired Brightness value (0 to 255) and press the OK button to set. Factory default is 128

- **Contrast** – Use the Scroll Up/Down button to select Contrast. Press the OK button to enter the Contrast menu. Use the Scroll Up/Down button to select the desired Contrast value (0 to 255) and press the OK button to set. Factory default is 128.

- **Saturation** – Use the Scroll Up/Down button to select Saturation. Press the OK button to enter the Saturation menu. Use the Scroll Up/Down button to select the desired Saturation value (0 to 255) and press the OK button to set. Factory default is 128.

- **Sharpness** – Use the Scroll Up/Down button to select Sharpness. Press the OK button to enter the Sharpness menu. Use the Scroll Up/Down button to select the desired Sharpness value (0 to 255) and press the OK button to set. Factory default is 64.

- **Hue** – Use the Scroll Up/Down button to select Hue. Press the OK button to enter the Hue menu. Use the Scroll Up/Down button to select the desired Hue value (0 to 255) and press the OK button to set. Factory default is 128.

- **Device Address** – Use the Scroll Up/Down button to select Device Address. Press the OK button to enter the Device Address menu. Use the Scroll Up/Down to select the Desired Address ranging from 1 to 32 then press the OK button to set.

- **CELL ID** –Use the Scroll Up/Down button to select CELL ID. Press the OK button to enter the CELL ID menu. Use the Scroll Up/Down button to select the desired CELL ID ranging from 0 to 65535 then press the OK button to set. Factory default is 0.

- **Stream ID** – Use the Scroll Up/Down button to select Stream ID. Press the OK button to enter the Stream ID menu. Use the Scroll Up/Down button to select the desired Stream ID ranging from 0 to 65535 then press the OK button to set. Factory default is 1000.

- **Network ID** – Use the Scroll Up/Down button to select Network ID. Press the OK button to enter the Network ID menu. Use the Scroll Up/Down button to select the desired Network ID ranging from 0 to 65535 then press the OK button to set. Factory default is 100.

- **ORG Network ID** – Use the Scroll Up/Down button to select ORG Network ID. Press the OK button to enter the ORG Network ID menu. Use the Scroll Up/Down button to select the desired ID ranging from 0 to 65535 then press the OK button to set. Factory default is 10.

- **Network Name** – Use the Scroll Up/Down button to select Network Name. Press the OK button to enter the Network Name menu. Use the Scroll Up/Down button to select the

first character for the desired Network Name then press the OK button to set. Repeat the process for each character in the desired Network Name. A Network Name can consist up to 16 characters.

▪ **Default Configuration –**

⚠️ Caution: Once the OK button is pressed at the Default Config menu the unit will automatically reset to the factory default settings.

❖ All settings or changes to the encoder/modulator will be lost.

If you wish to set the modulator back to the factory default settings use the Scroll Up/Down button to reach Default Configuration then press the OK button.

▪ **LCN Mode** – Use the Scroll Up/Down button to select LCN Mode. Press the OK button to enter the LCN Mode menu. Use the Scroll Up/Down button to select the desired LCN Mode: APN, EACEM, ITC, NorDig. The factory default is APN. Press the OK button to set.

▪ **1 Video Input** – Use the Scroll Up/Down button to select 1 Video Input. Press the OK button to enter the 1 Video Input menu. Use the Scroll Up/Down button to select the Video Input option: NTSC, PAL, ASI. The factory default is NTSC. Press the OK button to set.   If the modulator has more than one video input scroll through the Advanced Menu for the additional video input menus.

▪ **1 Program Num** – Use the Scroll Up/Down button to select 1 Program Num. Press the OK button to enter the 1 Program Num menu. Use the Scroll Up/Down button to select the desired 1 Program Num option ranging from 0 to 65535 then press the OK button to set. Factory default is 1001. If the modulator has more than one video input scroll through the Advanced Menu for the additional Program Num menus.

▪ **1 Channel Name** – Use the Scroll Up/Down button to select 1 Channel Name. Press the OK button to enter the 1 Channel Name menu. Use the Scroll Up/Down menu to select the first character of the desired Channel Name then press the OK button to set. Repeat the process until the Channel Name is completed. If the modulator has more than one video input scroll through the Advanced Menu for additional channel name menus.

▪ **1 Provider Name** – Use Scroll Up/Down button to select 1 Provider Name. Press the OK button to enter the 1 Provider Name menu. Use the Scroll Up/Down button to select the first character of the desired 1 Provider Name then press the OK button to set. Repeat the process until the desired Provider Name is completed. If the modulator has more than one video input scroll through the Advanced Menu for additional Provider Name menus.

▪ **1 LCN** – Use the Scroll Up/Down button to select 1 LCN. Press the OK button to enter the 1 LCN menu. Use the Scroll Up/Down button to select the desired LCN value then press the OK button to set. The 1 LCN value range is from 1 to 999. If the modulator has more than one video input scroll through the Advanced Menu for additional LCN menus.

▪ **1 Aspect Ratio** – Use the Scroll Up/Down button to select 1 Aspect Ratio. Press the OK button to enter the 1 Aspect Ratio menu. Use the Scroll Up/Down button to select the desired Aspect Ratio option of 4:3 or 16:9 then press the OK button to set. Factory default is 4:3. If the modulator has more than one video input scroll through the Advanced Menu for additional Aspect Ratio menus.

❖ To **exit the Advanced Menu** use the Scroll Up/Down button to select Exit then press the OK button. Exit Exit Menu will appear on the LCD screen. Press the OK button twice to exit.

11

❖ Once the settings are made and the modulator is programmed (a) remove power from the unit by disconnecting the power supply cable from the DC 12V jack, (b) wait 5 seconds and (c) reconnect the power cable to the unit's DC 12V jack. This will allow the modulator to capture the new settings.

Procedure to connect to the Encoder via the remote setup port
The following procedure will allow the installer to setup the Encoder via the GUI
(Intranet setup- closed LAN setup)

1. Power up the Encoder.

2. Press the OK button on the Front Panel.

3. Enter the Password 0000 to enter Advanced Menu Setup.

4. Scroll to the Device Address Menu.

5. Set a unique Device address for each encoder being installed in the system.

   Device Address ranges from 1~255

Warning: Setting the "DEVICE ADDRESS" to 0 will clear the network setting to the Factory Default value.

6. Connect each encoder using a standard CAT5e cable from the Remote Setup port (located on the rear panel of the encoder) to a switch. Connect a CAT5e cable from the switch a PC.

NOTE: To connect to the encoder directly to a PC use a CAT5e Crossover cable

7. Set the PC via the Control Panel to **"Obtain an IP address automatically"**

Start- Control Panel

View Network Status and Tasks

SDM-1000_2000_4000 Manual V1.0

8. Select 'Change Adapter Settings' from the left plane

Control Panel Home

Manage wireless networks
Change adapter settings
Change advanced sharing settings

View your basic network information

NB5741G
(This computer)

View your active networks

9.Select Local Area Connection Icon
Then Right Click – Select Properties
Internet Protocol Version 4(TCP/IPv4) Properties
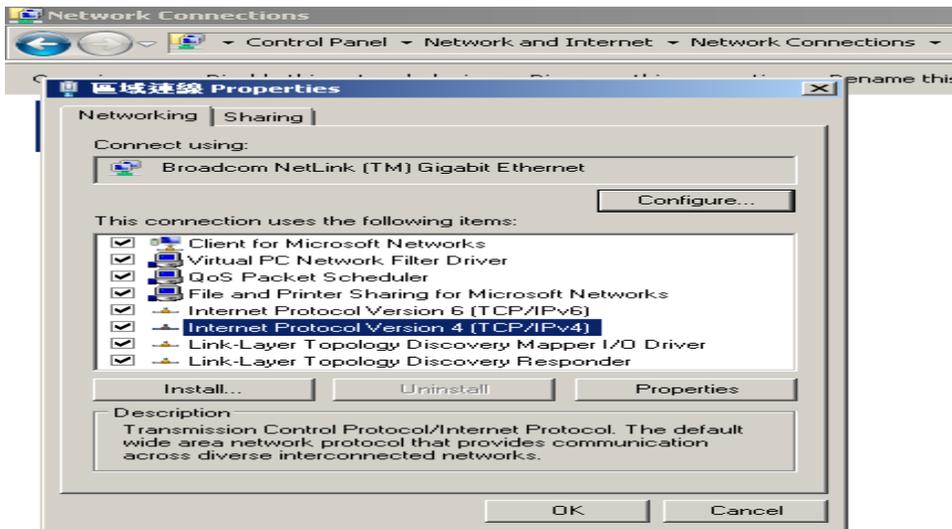
10. Select "Obtain an IP address automatically" & "Obtain DNS server address automatically"

SDM-1000_2000_4000 Manual V1.0
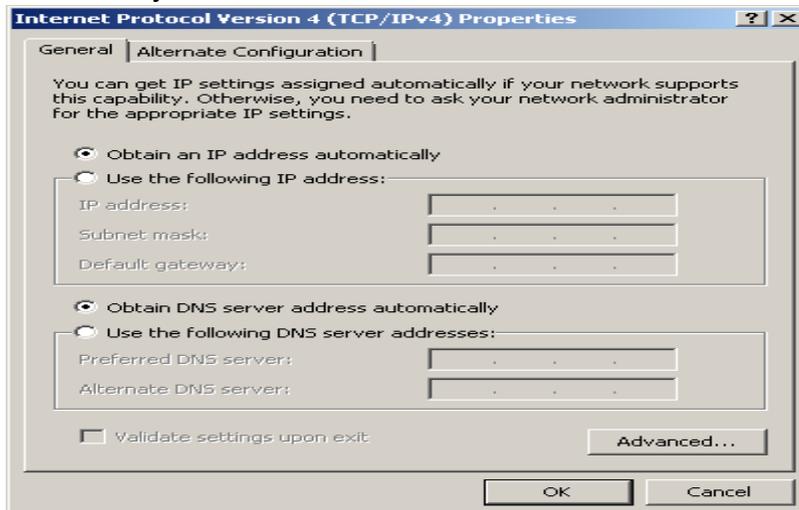
11. After setting the PC to obtain IP address & Obtain DNS server automatically
    Select Start- Computer- Network
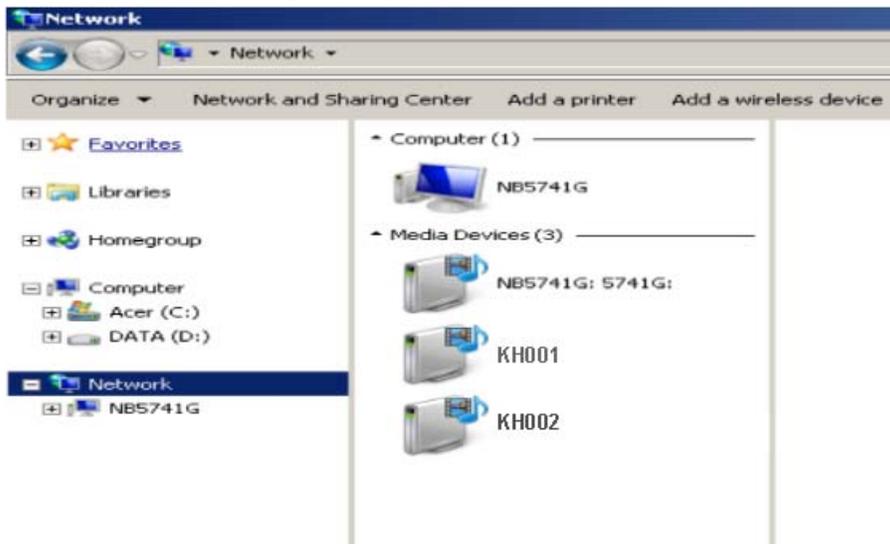
12. After selecting Network- the encoders will show up on the right side under Media
Devices. Each device will show up by Device Address. (KH001, 002, 003...)
    Right Click on the icon for the Encoder you want to setup**. Select 'View device
    webpage'**

13. Welcome page will be displayed as shown

14. **Select** the Common Setup tab.
    User will be presented with encoders *'Authentication Required'* screen.

15. **Enter** User Name and Password.
    User Name: **admin**
    Password: **Admin123**
16. **Change** settings of the encoder via the Common Setup, Encoder Setup, Network Configuration, and Administration Tabs.

17. **Select** Network Configuration Tab.

15

18. Confirm '**Enable DHCP'** check box is selected for closed in-house network.
    (If using internet to connect to the Encoder see Internet setup procedure)
19. Save all changes. The user is required to do a local save if any changes are made on the Common / Encoder Setup tabs. Once all changes have been made and are complete- use the **Upload and Reboot function** to apply changes.

'Waiting for device rebooting' will appear as unit reboots and save the changes.
After the encoder recovers from rebooting- we recommend you save/ backup the configuration file for each encoder.
Select Administration Tab- then **Backup.** A **config.hex** file will be created. The file will be located in My Computer->C Directory->Documents and Settings->User->My Documents->Downloads>configs.hex

NOTE TO INTEGRATOR-

WE HIGHLY RECOMMEND YOU RENAME THE CONFIG.HEX FILES FOR EACH ENCODER DEVICE
EXAMPLES: config_single_dev1_sitename.hex , config_dual_dev2_sitename.hex

CONFIGURATION FILES FOR THE SINGLE, DUAL, AND QUAD ENCODERS ARE DIFFERENT AND ARE NOT INTERCHANGEABLE.

SDM-1000_2000_4000 Manual V1.0

Procedure to connect to the Encoder for remote access and monitoring

The following procedure will allow the integrator to access the encoder via the GUI for remote status monitoring and control.

Overview of Setup
Accessing the Encoders via the internet will require a VPN device with a Static IP
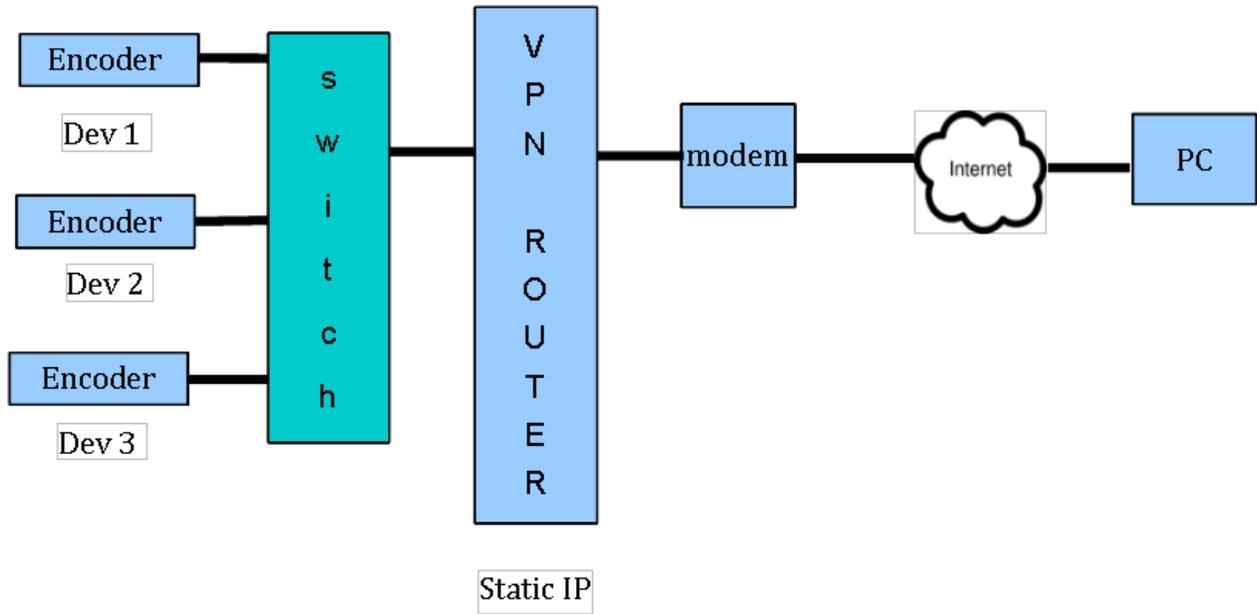
1. Using the instructions located in **Procedure to connect to the Encoder via the remote setup port** enter a unique Device Address for each encoder.
2. Setup each encoder's output channel and other parameters as required.
3. Select the Network Configuration Tab.
4. Deselect 'Enable DHCP'

5. Enter a unique Static IP address for each encoder.
6. Enter the Subnet Mask.
7. Enter the Gateway IP address from VPN device.
8. Save Configuration of Network settings by selecting Save Config button.
9. Connect the Ethernet switch to the VPN Device (Static IP Required) connected to the internet.

SDM-1000_2000_4000 Manual V1.0

Contact your network administrator for the VPN device setup
10. Establish a VPN connection from a PC or laptop from an external internet connection.
11. Once the VPN tunnel has been established- Enter the Specific IP address of the Encoder in which to monitor in your internet browser (example: 192.168.100.10)
12. Save any changes made to the encoder and reboot encoder.

UPnP Help Section for Windows
Windows 7:
Follow these steps to enable UPnP in **Windows 7**

☉ **Control Panel- Locate Icon for 'Network and Sharing Center'**

☉ **Click** *'Change Advanced sharing settings'* (located on the top left side)

Control Panel Home

Manage wireless networks

Change adapter settings

Change advanced sharing settings

☉ **Select 'Turn on network discovery'** located under **Network Discovery** section

Change sharing options for different network profiles

Windows creates a separate network profile for each network you use. You can choose specific options for each profile.

Home or Work (current profile)

Network discovery

When network discovery is on, this computer can see other network computers and devices and is visible to other network computers. What is network discovery?

◉ Turn on network discovery
◯ Turn off network discovery

File and printer sharing

When file and printer sharing is on, files and printers that you have shared from this computer can be accessed by people on the network.

◉ Turn on file and printer sharing
◯ Turn off file and printer sharing

Public folder sharing

When Public folder sharing is on, people on the network, including homegroup members, can access files in the Public folders. What are the Public folders?

◉ Turn on sharing so anyone with network access can read and write files in the Public folders
◯ Turn off Public folder sharing (people logged on to this computer can still access these folders)

Media streaming

When media streaming is on, people and devices on the network can access pictures, music, and videos on this computer. This computer can also find media on the network.

Media streaming is on.

Save changes   Cancel

☉ **Save** Changes.

SDM-1000_2000_4000 Manual V1.0

For the UPnP architecture to work in Windows XP, the Internet gateway device must appear in Network Connections.

Windows XP:

Click **Start**, click **Run**, type **appwiz.cpl**, and then click **OK**.
1. Click **Add/Remove Windows Components**.
2. In the **Components** window, click **Networking Services**, and then click **Details**.
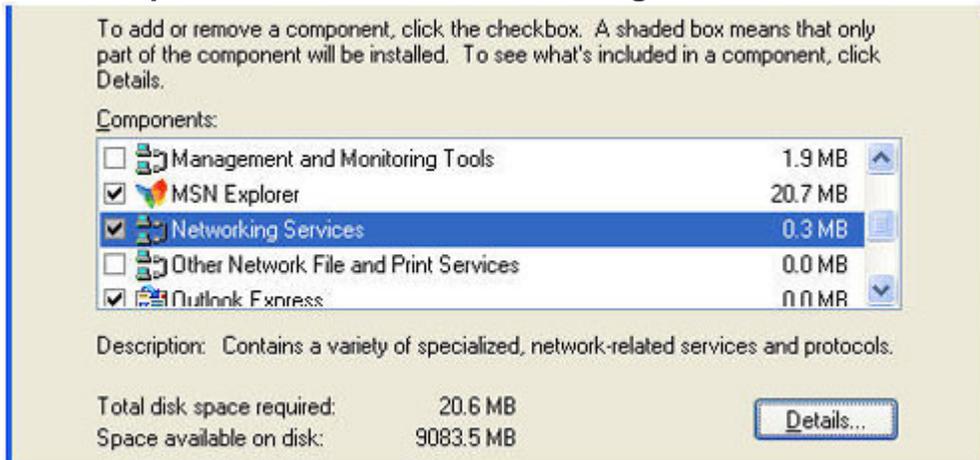
3. Click to select the **Internet Gateway Device** and **UPnP User Interface** check boxes in the **Subcomponents of Networking Services** window, if they are not selected.
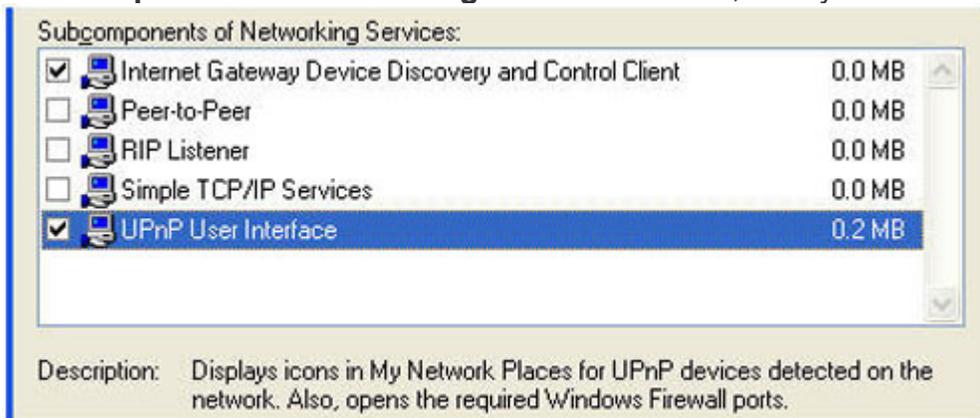
4. Follow the instructions that appear on the screen to complete the installation. Or, if you did not make any changes, close the Add or Remove Programs windows and Control Panel.
5. Start the Services MMC snap-in. To do this, click **Start**, click **Run**, type **services.msc**, and then click **OK**.

SDM-1000_2000_4000 Manual V1.0

6. Locate **SSDP Discovery Service** in the list of services.
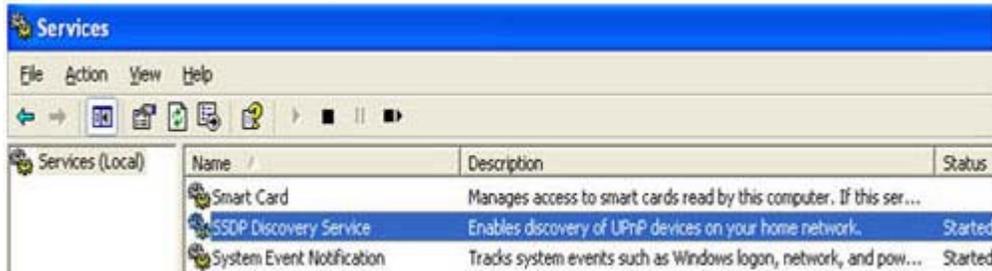
7. If the status is not **Started**, double-click **SSDP Discovery Service** to open the **SSDP Discovery Service Properties** dialog box.

8. In the **Startup type** box, click **Automatic**, and then click **Start** under **Service status**. Then, close the **SSDP Discovery Services Properties** dialog box.

After you follow these steps, the SSDP Discovery Service is running and will automatically start when you start the computer.

Note: After you enable UPnP and start the SSDP Discovery Service, it may take 10 minutes for a router to be discovered and appear in Network Connections and in My Network Places.

DIGITAL MODULATOR NOTES

PRODUCT NOTES:

ITEM	VALUE
PASSWORD	
SERIAL NUMBER	
INSTALLATION DATE	
PURCHASE DATE	
VIDEO 1 INPUT	
VIDEO 2 INPUT	
VIDEO 3 INPUT	
VIDEO 4 INPUT	

SDM-1000_2000_4000 Manual V1.0